

## REMARKS

This is the response to the Office Action of August 20, 2002 in which the Examiner:

- (a) objected to the specification based on some formalities;
- (b) objected to certain language in claims 10 and 12-14
- (c) rejected claims 1-7 as obvious over De Man (U.S. 5,304,813) in view of Kaule (US 4,451,521).

Based on the amendments and following remarks below, the application is deemed to be condition for allowance and action toward that end in respectfully requested.

### **I. AMENDMENTS TO THE SPECIFICATION REMEDY THE OBJECTIONS OF THE EXAMINER**

The specification has been amended without adding and “new matter” and which remedy the objections of the Examiner. Accordingly the objections to the Specification should be withdrawn.

### **II. AMENDMENTS TO THE CLAIMS REMEDY THE OBJECTIONS OF THE EXAMINER**

Claim 10, as amended, is directed to a sensor having an integrated additional UV-sensor. The wording of the specification on pg. 2 par. 26 “integrated UV sensor” is clear to one of ordinary skill in the art, in the way that only an additional sensor can be meant by the term “integrated sensor”. Therefore amended claim 10 is merely a clarification of what has already been implied in the specification.

Consequently the dependency of the claims is no longer a problem.

### **III. THE REJECTION IN VIEW OF THE REFERENCES SHOULD BE WITHDRAWN**

- A. NEITHER DEMAN, NOR KAULE DISCLOSE, TEACH OR OTHERWISE SUGGEST THE FEATURE OF THE FLORESCENT AUTHENTICITY BEING ILLUMINATED AT THE EXCITATION WAVELENGTH WITH AN EXCITATION PULSE AND A RESPONSE PULSE DETECTED WITH A DEFINED TIME DELAY.

The Examiner asserts that Claim 1-7 are obvious over De Man and Kaule. However, neither reference discloses, teaches or otherwise suggests the feature wherein the fluorescent authenticity feature is illuminated at the excitation wavelength with an excitation pulse and a response pulse following the excitation pulse is detected with a defined time delay.” Indeed Kaule does not teach use of pulses at all!

DeMan merely mentions that one may use “light within a narrow spectral width in pulses of short duration.” Each light source belongs to a color group of a set of color groups, with each source of the same color having the same spectral width”. and “the photoelectric elements convert the modified light into electrical sensor signals.” (DeMan. Col. 2 1:24-29). The light is “converted into light of longer wavelength by whatever fluorescing dyes may be located in a region”. (DeMan Col 4, 1. 54-56).

DeMan does not disclose teach or suggest – a response pulse following the excitation pulse, detection of the response pulse or detection at a defined time delay.

In particular it is indicated in the specification that the wording “when combined with one another” applies to use “a response pulse following the excitation pulse with a defined time delay” for all kind of methods described which are now recited in the claims.

B. DEMAN ACTUALLY TEACHES AWAY FROM THE INVENTION

DeMan teaches mapping of a document merely by using different colored light sources as a discriminating parameter and thereby determines the mere presence of dyes and their distribution. DeMan however does not say anything about the response with regard to its temporal behavior.

The above new features of the claimed invention in addition to the wavelength, use a defined time delay to detect a response pulse and thereby discriminate the response from other light emissions. The arguments of the Examiner with regard to former claim 6 are therefore not applicable in view of amended claim 1. One of ordinary skill in the art may know about the basic principle of reaction delays, however, the Examiner also admits that this delay maybe “admittedly small” and consequently usually not known as indeed this depends on the difficult and broad variety of material properties of how “the material reacts to the stimulation.” It is considered as a particular advantageous inventive step that the present invention uses a “defined” time delay for detection of the response pulse from a fluorescent authenticity feature.

In sum, DeMan teaches away from the present invention as it relies merely on the spectral shape and wavelength of the used light sources. DeMan does not disclose, teach or otherwise suggest anything about the response with regard to its temporal behavior. It is kindly disputed one of ordinary skill in the art would try to apply basic knowledge about reaction delays

in combination with the teaching of DeMan as there is no need or problem or motivation indicated by DeMan to do so.

The inventor has outlined that the up-conversion embodiment is particularly difficult to be realized and therefore inventive as such. The selection of the response wavelength has to be very exact — up to 2nm (is not disclosed)! The light intensity is particular low e.g. due to the necessary filters of  $10^{-7}$ . One has to measure very fast — see claim 3 — and fast rise and decay times result in even more lower signal intensity. This difficulty should not to be underestimated and is present when using pulsed excitation and detection. The stray light is very strong compared to the measured light with the inventive system as one likes to use open aperture (to collect as much intensity as possible).

#### C. THE OTHER REFERENCES DO NOT DEFEAT PATENABILITY

The Examiner cites only documents disclosing OW-systems, which have no intensity problems at all. DeMan is a mere pulsed excitation system and does not rely on pulsed detection. Also here there are no intensity problems at all.

New claims 7, 8 and 9 also form inventive embodiments as they rely on detecting the response pulse at a defined time delay.

The examiner combines three or more documents, thereby trying to arrive at the subject matter of claim 8 and following claims. It has been demonstrated that the combination of references do not render obvious the invention.

Indeed, some of the references made of record are in technical fields very much different from the subject matter claimed. Schwartz, for instance, is directed to a bar code scanner and

Cherney to a collector for solar cells. Both teachings can not be applied – for instance, the wavelengths are very much different. The light intensities which have to be handled by the present invention during excitation and — in particular — during detection are magnitudes of order below those of Schwartz and Cherney.

## CONCLUSION

In view of the above, the application is deemed to be in condition for allowance and action to that end is respectfully requested.

Should the Examiner require or consider it advisable that the specification, claims an/or drawings be further amended or corrected in formal respects, in order to place the case in condition for final allowance, then it is respectfully requested that such amendment or correction be carried out by Examiner's Amendment and the case be passed to issue.

Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing this case to allowance, the Examiner is invited to telephone the undersigned.

Respectfully submitted,



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## **APPENDIX – (SPECIFICATION & CLAIMS IN “MARKED-UP” FORM)**

### **IN THIS SPECIFICATION:**

Please amend the text at page 4, lines 15-20 of this specification as below.

It is preferable for the so-called up-conversion effect to be used. In this case, the excitation wavelength is longer than the [reflected] wavelength emitted from the authenticity feature. Expressed in the frequency domain, this means that the excitation frequency is lower than the response frequency.

### **IN THE CLAIMS:**

Please add claims 25-30 and amend claims 1, 3-5, 7, 9-12, 19 and 20 as shown below:

1. (Amended) A sensor for authenticity identification of luminescent signets on documents, in which the signet is illuminated as a fluorescent authenticity feature, with a[n] specific excitation wavelength and may respond at a different wavelength, with the response wavelength being detected and evaluated by a radiation receiver, wherein a focused beam, which is emitted from a beam source, is converted by a focusing optics in such a manner that a scanning line, which is approximately in the form of a bar, is projected on the surface of the document to be investigated, which causes the signet, which is arranged on the document, to fluoresce at least in one subregion and the fluorescence signal produced in this way is emitted from the authenticity feature and passed via detection optics to an evaluation unit, which evaluates the fluorescence signal

and wherein the fluorescent authenticity feature is illuminated at the excitation wavelength with an excitation pulse and a response pulse following the excitation pulse is detected with a defined time delay.

3. (Twice Amended) [An authenticity feature for detection using a] The sensor as claimed in claim 1 or 2, wherein, in order to identify the signet on a document, the signet is equipped, at least in subregions, with a pigment which can be detected using the up-conversion effect, and the sensor is adapted to use the conversion effect, wherein the specific execution wavelength is longer than the response wavelength.

4. (Twice Amended) [An authenticity feature for detection using a] The sensor as claimed in claim 1 or 2, wherein, in order to identify the signet on a document, the signet is equipped, at least in subregions, with a pigment which [the signet] can be detected using the down conversion effect and the sensor is adapted to use the [as a fluorescent authenticity feature, using the] down-conversion effect wherein the specific excitation wavelength is shorter than the response wavelength.

5. (Twice Amended) [An authenticity feature for detection using a] The sensor as claimed in claim 1 or 2, wherein, in order to identify the signet on a document, the signet is equipped, at least in subregions, with a pigment which can be detected using [the signet is excited, as a fluorescent authenticity feature, at a specific wavelength, and responds at] the same wavelength as the specific excitation wavelength and the sensor is adapted to detect the response wavelength at the same wavelength as the specific excitation wavelength.



7. (Twice Amended) The [authenticity feature for detection using a] sensor as claimed in one of claims 3 to [claim] 6, wherein the pigments are added directly to an applied solution, to an applied paint, to the adhesive or to the paper.

9. (Twice Amended) The sensor as claimed in one of claims 1 to 5 and 7 to 11 [claim 8, wherein the sensor is in the form of] formed as a two-band sensor, in which the [test object] fluorescent authenticity feature is illuminated once and in which two different spectral bands are evaluated.

10.(Twice Amended) The sensor as claimed in one of claims 1 to 12 [claim 9], wherein [the]an additional sensor is integrated in the form of a UV luminescence sensor, in which the [test object] fluorescent authenticity feature is illuminated with UV light [(for example using a UV LED at] of a different [wavelength of 370 nm),] and wherein the luminescence signal is detected in a further different spectral band.

11. (Twice Amended) The sensor as claimed in claims 1 to 14 [claim 10], wherein an additional object detector [(optical barrier)] is used, which indicates to the sensor when the [object (signet)] signet starts and when it ends.

12. (Twice Amended) The sensor as claimed in claim 1 or 2 [11], wherein in order to identify the signet on a document, the signet is equipped, at least in subregions, [pigments] with a pigment having a fast rise time and a fast decay time [(for example typically 0.1 m/s) are used.] in order of magnitude of 0.1 ms and the response pulse following the excitation pulse is detected with a defined time delay in the order of magnitude of 0.1 ms.

19. (Twice Amended) The sensor as claimed in one of claims 1 to 22 [claim 18], wherein a reflection cone is arranged in front of the electronic evaluation unit for beam intensification

which is in the form of a funnel-shaped or cylindrical [hollow body having a metallicly coated surface on the inside, or is in the form of] a transparent [funnel-shaped or cylindrical] solid body.

20. (Twice Amended) The sensor as claimed in claim 23 or 24 [19], wherein a photomultiplier having a detection surface [roughly in the form of a point and whose] said surface [corresponds] corresponding approximately to the outlet surface of the reflection cone, is arranged immediately behind the reflection cone.

25. (New) The sensor as claimed in claim 6, wherein the external light is suppressed by evaluating only the pulsed fluorescence signals which are received with the pulse repetition frequency of the pulsed illumination.

26. (New) The sensor as claimed in claim 7, wherein the external light is further suppressed by filtering the received signal by means of an electronic high-pass filter.

27. (New) The sensor as claimed in claim 8, wherein the identification confidence of the authenticity identification is increased by identifying the fluorescent authenticity feature during two or more periods of a sequence of pulses.

28. (New) The sensor as claimed in claim 10, wherein the UV light is emitted from an UV-LED at a wavelength of 370nm.

29. (New) The sensor as claimed in claim 11, wherein the signal detector is formed as an optical barrier.

30. (New) The sensor as claimed in claim 19, wherein the reflection cone is a combination of cylindrical lens and the funnel shaped transparent solid body.